

What is claimed is:

1. An apparatus for producing a semiconductor device, comprising:  
a reaction chamber installed in a reaction furnace;  
5 a discharge port for removing from the reaction chamber reaction byproducts formed during producing of the semiconductor device;  
a heater for generating heat to the reaction chamber;  
a hot fluid supply unit for introducing heat from the heater and the reaction chamber into the discharge port, the hot fluid supply unit comprising a fluid container for receiving a  
10 heat transfer fluid;  
a hot fluid generator adjacent the reaction chamber in the reaction furnace, the hot fluid generator defining a fluid channel for conveying the heat transfer fluid and transfers heat generated from the heater and the reaction chamber to the heat transfer fluid supplied from the fluid container; and  
15 a heat transfer element for transferring heat to the discharge port using the heat transfer fluid supplied from the hot fluid generator.

2. The apparatus according to claim 1, wherein the hot fluid generator comprises a conduit that defines the fluid channel.

3. The apparatus according to claim 1, wherein the hot fluid generator comprises multiple fluid channels, each of fluid channels including an on/off valve for opening or closing a passage for the heat transfer fluid.

4. The apparatus according to claim 1, wherein the hot fluid generator is located at an upper portion of the reaction chamber.

5. The apparatus according to claim 1, wherein the hot fluid generator is located at a side portion of the reaction chamber.

6. The apparatus according to claim 1, wherein the discharge port is connected to a vacuum pump via a vacuum pipe, and the heat transfer element comprises first and second fluid conduits, the first fluid conduit having a diameter larger than that of the discharge port, and forming a first structure with the discharge port which extends along the same axis as the

discharge port, and the second fluid conduit having a diameter larger than that of the vacuum pipe, and forming a second structure with the vacuum pipe which extends along the same axis as the vacuum pipe.

5           7       The apparatus according to claim 6, wherein the heat transfer element is formed of a plurality of coil-shaped fluid conduits that are wound about the discharge port and the vacuum pipe.

10           8.       The apparatus according to claim 7, wherein the spaces between the coil-shaped fluid conduits and the discharge port and vacuum pipe, respectively, are filled with a substance for facilitating heat transfer.

15           9.       The apparatus according to claim 8, wherein the heat transfer substance comprises a metal.

            10.       The apparatus according to claim 1, wherein the heat transfer fluid comprises a gas or liquid.

20           11.       The apparatus according to claim 10, wherein the heat transfer fluid comprises N<sub>2</sub> gas, He gas, Ar gas, or H<sub>2</sub>O.

25           12.       The apparatus according to claim 6, wherein when the heat transfer fluid is a gas, and the heat transfer element comprise nozzles for supplying the heat transfer fluid to the discharge port and the vacuum pipe.

            13.       The apparatus according to claim 1, the fluid container is disposed within a utility box.

30           14.       The apparatus according to claim 1, further comprises a flow control element for controlling a flow rate of the heat transfer fluid from the fluid container.

            15.       The apparatus according to claim 14, wherein the flow control element is one of a mass flow controller and a flow meter.

16. The apparatus according to claim 1, which comprises a thermocouple for sensing and monitoring the temperature of the heat transfer fluid from the hot fluid generator.

17. The apparatus according to claim 16, further comprising a main controller for opening or closing an on/off valve formed at the multiple fluid channels based on the temperature of the heat transfer fluid which is sensed by the thermocouple.

18. The apparatus according to claim 1, wherein the reaction chamber is a deposition chamber for forming a silicon nitride film on a wafer using dichlorosilane and ammonia.

19. The apparatus according to claim 6, further comprising a conduit for transferring the heat transfer fluid from the hot fluid generator to the vacuum pipe.

20. The apparatus according to claim 19, which further comprises an on/off valve for permitting or preventing the flow of the heat transfer fluid supplied from the hot fluid generator.

21. The apparatus according to claim 1, wherein the heater is formed within the furnace adjacent the reaction chamber.